Traditional Ultrasound Inspection on Composite Material

Introduction

Solid laminate structures are structures that usually do not contain lines of adhesive but use the resin of the pre-impregnated material for polymerization. This means that delamination between the skins that make up the framework is a common flaw. The detection of the discontinuity is rather simple since there is a tiny layer of gas inside the delamination that causes a substantial variation in acoustic impedance, resulting in a high reflection.

The protective layer of the hides that is not properly removed throughout the production phases is one possible cause of delamination. As a result, the identified delamination is caused by the presence of foreign material. Because the protective skin of the composite material inhibits bonding, and therefore an interspace between the skins persists, the detectability is very similar to that of a foreign substance and delamination in order to define the discontinuity.

Attenuation & noise level issues

The size, attenuation, and geometry of composite parts vary greatly according to the various production techniques. As a result, manufacturers must verify that the inspection equipment they use can handle the largest range of composite material configurations. Lower frequencies, such as 2 MHz to 500 KHz, may be required for thicker or attenuative materials.

The trade-off is that when the probe frequency rises, the signal resolution falls dramatically. A thinner material, on the other hand, necessitates a shorter wavelength to distinguish the top and bottom surfaces. Probes with a frequency of up to 10 MHz will be chosen in this scenario. Quality of the signal has also an important part on the final result of the control.

UT8000 with low frequency probe

We have tested a composite panel, thickness 12 mm, using a traditional UT solution. A-Scan is at the base of the advanced technique used in application where time and productivity are important.

The UT8000, thanks to its 400V square pulse solution and selectable narrowband filters is the instrument of choice for this kind of

inspection. In this case we just work to identify areas of delamination with a probe of 2.5 MHz.

It is interesting to see how fast is the setup of the instrument, compared to Phased Array instrument, and easy to identify the areas of delamination.

See more about the capabilities and benefits of the UT8000 flaw detector.